A STUDY OF INDUSTRIAL ARTS DRAFTING PROGRAMS IN OKLAHOMA PUBLIC HIGH SCHOOLS DURING 1983-1984

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CHAPTER I

INTRODUCTION

From an historical aspect, the field of industrial arts has undergone an evolution of change. Originally called manual training, the industrial arts program was instituted in the public schools of Oklahoma in 1904.[1] Drafting was the first course of instruction offered, and the choice of curriculum format was solely the instructor's responsibility. This is still the case today.

For the purpose of providing an efficient and practical method of teaching industrial arts courses, the American Vocational Association formed a committee in 1927.[2] Even though the committee has no jurisdiction over schools, it has continuously, throughout the years, disseminated literature advising constructive course objectives and formats for industrial arts instructors on a nation wide basis.

Realizing the need for its own industrial arts programs, in 1945 the first State Industrial Arts Clinic workshop was held at the Oklahoma Agricultural and Mechanical College.[3] At the workshop, it was expressed that a state organization would be of greater value in dealing with special problems of industrial arts educators, and a subsequent organization, the Oklahoma Industrial Arts Association, was formed in the fall of 1946.[4] As a result, there has been an awareness that the industrial arts profession has had to keep abreast in a rapid developing environment even though it has been constrained economically when

compared with advanced industry. Hence, there have been revisions in the teaching programs when needed to ensure their efficiency. There have also been changes in physical classroom conditions. Furthermore, new technology has made it possible for improvements over the years in the design, safety, and equipment utilized in the industrial arts laboratory. To keep pace, there has been research in the past to evaluate equipment in Oklahoma's industrial arts laboratories; another area of research has been for evaluation and/or updating in the teacher training programs. This is an important facet of the industrial arts programs. It is necessary to continue research and to recommend improvement when needed in those pertinent areas of the industrial arts program--the curriculum, the teacher training programs, and the equipment.

The Statement of the Problem

When an industrial arts program is going to be evaluated, revised or updated, comparisons to previous studies have to be made to determine the specific need. It is therefore necessary that, periodically, studies be done to ascertain the status of the existing programs. The intent of this research was to update a previous study done in 1967 and to furnish new data on existing conditions and current practices of industrial arts programs in the state of Oklahoma.

The Purpose of the Study

The purpose of the study was to survey the industrial arts drafting programs in the Oklahoma public high schools. This will enable existing industrial arts programs to be compared, identify new trends

and patterns, and bring to light any weaknesses in the programs. Drafting instructors will be able to utilize the study and improve the programs. In addition, the study will be beneficial as a guideline for the creation and development of new programs.

Major Objectives

This study was undertaken to determine the present status of the industrial arts drafting programs in Oklahoma's public high schools. There were six questions to be answered in the study: (1) what is the educational background of the industrial arts drafting instructor; (2) what industrial experience does the instructor have; (3) what is being taught; (4) what classroom facilities are available; (5) what methods of presentation are being used; and (6) what is the average size of the industrial arts drafting class. From the resulting data, it was possible to compare and evaluate existing industrial arts drafting programs. This, in turn, provided a basis for future improvements through the use of more effective program design methods.

Assumptions

There were two assumptions regarding this study: (1) industrial arts drafting instructors who participated in the survey were a representative sample of all Oklahoma industrial arts drafting instructors, and (2) the respondent answered the survey questions as truthfully and honestly as possible.

Limitations of the Study

This study selected subjects from Oklahoma schools that were

listed as offering industrial arts drafting courses during the school year 1983-1984. This study did not include subjects in junior high and elementary schools; it was limited to subjects teaching in high schools only. Another limiting factor was that the use of a telephone survey did not consider the intellectual abilities or prejudices of the selected subjects; hence, there was a possibility of biased data.

Definition of Terms

It is necessary to have an accurate comprehension of the terms which are to be used in this study frequently. Below is a list of the terms and their definitions.

Manual Training: the process of students learning to construct models while, at the same time, developing skills by utilization of the tools and the intellect.[5]

Industrial Arts: an educational, instructional program that offers a person a broad-based exposure to industry and community development and relations (production, consumption and recreation) while working with materials and goods.[6]

Industrial Arts Drafting: a course offered in high schools that is geared to creating an individual with the optimum skills necessary for employment in industrial fields. Basic courses are instruction in orthographic projections, lettering, pictorial drawing, sections, auxiliary views, and architectural drawings.[7]

Drafting Room Facilities: drafting machines, a reproduction printer, a light table, electric erasers, an overhead projector, a movie projector, and several drafting tables make up the necessary furnishings for a drafting classroom.[8]

Mechanical Drawing: the facilitation of a particular drawing by specific use of the drawing instruments. Principals of drawing, orthographic projection, assembly drawing, working drawings, engineering drawing, pictorial and reproduction of drawings are included in this term.[9]

Scope of the Study

1. The specific information requirement for this study as determined from the problem was an analysis of the industrial arts drafting programs in the Oklahoma public high schools during the school year 1983-1984.

2. The information, obtained by the normative survey method, was a previously prepared questionnaire which was subsequently phoned to the selected industrial arts drafting instructors; the selections were taken from the Oklahoma public high school's annual directory for the school year 1983-1984. Out of a list of approximately 400, one out of every four was selected.

3. The information was then taken from the questionnaire and tabulated and assembled into table format for visual scrutinization.

ENDNOTES

[1]Oklahoma State Department of Education, Industrial Arts in Oklahoma (Oklahoma City, 1951), p. 15.

[2]American Vocational Association, A Guide to Improving Instruction in Industrial Arts (Washington, D. C., 1953), p. 100.

[3]Marion Edmund Franklin, "A History of Industrial Education in Oklahoma up to 1950" (pub. Ph.d. dissertation, University of Oklahoma, 1952), p. 62.

[4]Ibid.

[5]Frank M. Leavitt, Examples of Industrial Education (Boston: Ginn and Company, 1912), p. 15.

[6]Oklahoma curriculum Improvement Commission, A Guide to Improvement of Industrial Arts in Oklahoma (Oklahoma City, 1965), p. 2.

[7]Ibid., p. 12.

[8]Frederick E. Giesecke, Alva Mitchell, and Henry C. Spencer, Technical Drawing (New York: MacMillan Company, 1958), p. 12.

[9]Ibid.

CHAPTER II

REVIEW OF LITERATURE

Industrial arts drafting has been of great value to the sphere of education. There have been, since its inception in the United States, many innovative advances made in the classroom and its facilities with the attitude of improvement and optimum achievement in mind. The methods incorporated by industrial arts drafting instructors have also undergone adaptation to further ensure the highest standards of education for industrial arts drafting students. This chapter will present a brief discussion of the origin and development of industrial arts, and why subsequent evaluation and updating is necessary for further development. In addition, a review of previous research done in the field of industrial arts is provided.

Identification of the Need

Because of the evolution of technology and its requirements in a society built upon the premise of development, the field of industrial arts drafting has been one in which the necessity for evaluation and updating was imperative. Industrial arts drafting has played a major role in this developmental process.

An industrial arts drafting program can provide an environment that is conducive to the progress and maturity of a student in all aspects of life. Students can learn to become adept at responsible

decision making, advance planning, and skill development. Miller and Smalley believe that when a project method is supervised by an instructor, it involves the student's participation in practical areas such as " . . . manipulative activities, research, problem solving . . . "[1] Barlow further affirms the long-lasting benefit that a student can receive by participation in industrial arts because it can contribute " . . . to the general goals of education . . ."[2], which is to introduce the student to experiences and circumstances that will teach him or her to learn the ability to cope with and manage successfully.

It can be said that industrial arts drafting programs are a contributing force in the educational arena, and are therefore responsible for keeping abreast of the nation's industrial and technological progress so as to facilitate academic excellence.

The Origin and Development of Industrial Arts in the United States

In Colonial America, there were no public facilities for education; therefore, apprenticeship became the vehicle for manual training for boys and girls whose parents could not afford to educate them privately. The labor movement was committed to alleviating this dilemma with proposals for public education of all individuals. There were, at this time, several private charity schools that provided educational opportunities via schools and classrooms with apprenticeships for those who worked in factories.[3] In addition, a program of education was incorporated by The General Society of Mechanics and Tradesman in 1785. Its educational programs decreased with the advent of public education (1870), but the society still presented scholarships for

craftsmen in some schools. After the 1820s, there were many educational facilities for manual training--The Gardiner Lyceum (1823), Franklin Institute (1824), and San Francisco Mechanics Institute (1854), to mention a few.[4]

A significant development came about with the formation of the Rensselaer Institute (1824)--Van Rensselaer felt the students needed to be instructed in scientific and practical learning so as to ensure one of becoming a well-informed, integrated member of society.[5] This concept is in keeping with Rousseau's image of an individual capable of expert craftsmanship and knowledgeable in other subjects as well.[6]

There were further changes to take place--the factory eliminated, almost completely, the need for apprenticeships, and industrial education began to develop to meet the needs of industry. After the Civil War, there were more private trade schools and corporation schools. In addition, the Morrill Act of 1862 established agricultural and mechanical colleges in several states, Oklahoma Agricultural and Mechanical College being one of them.[7]

There were many individuals that contributed to industrial arts education--Pestalozzi, Fellenberg, Froebel, Saloman, and Della-Vos, to name a few. In particular, Calvin M. Woodward, William T. Harris, E. E. White, and John D. Runkle were continuously striving towards developing the manual training movement.[8]

Industrial arts education has developed as a result of educational needs not being fulfilled for some sectors of society. Initially, apprenticeships were provided for students to learn; these were followed by manual training facilities. With new technological advances,

industry's needs and legislation such as the Morrill Act of 1862 brought about more educational facilities. In addition, there were many individuals who can be credited with the development of the industrial arts movement. These developments and individuals have greatly altered and improved education as it once was in the Colonial era.

Industrial Arts Drafting--A Graphic Language

The term, graphic language, is simply " . . . many different ways technical information is communicated with drawings."[9] This has been the medium for communication and recording of history as evidenced by the Egyptian hieroglyphics. The pyramids in Egypt, for example, demonstrate that there was some conceptualization with regard to structure; i.e., drawings were made in advance to design these magnificent, historical specimens. In keeping with the need for further development, societies also discovered and developed materials upon which they could draw their ideas. The advances made from simple materials, to papyrus, to the mammoth paper industry today, offer some insight as to the development of usable materials in the area of drafting.[10]

Initially, the progress was one of slow momentum (before 8000 B. C.);[11] however, the pace was to gradually speed up with more diverse and complex designs forthcoming. Since 1900, graphic language has been an exceedingly necessary element in the progression of technology. As a result of newer technology and an ever expanding and advancing society, the complexity of industrial arts drawing has had to meet those demands; hence, there has been an evolution of the graphic language from the earliest forms of drawing to working drawings, assembly drawings, pictorial drawings, schematic drawings, architectural

drawings, maps, production illustrations, charts, development drawings and vector diagrams.[12] In addition, the implementation of standards enabled the industrial sector of society to effectively incorporate designs between each other. There are many companies that only design and manufacture one particular part of an item that will be later incorporated into the finished project. Without standardization, this would be impossible. The organizations that are committed to the promotion of and adherance to certain drafting standards are The American National Standards Institute, which was started in 1918 and the earliest; The Society of Automotive Engineers; The International Organization For Standardization, and the Department of Defense's organization.

Previous Research

As mentioned previously, Oklahoma implemented an industrial arts program in its public schools around 1904. Drafting was one of the first courses taught.[13]

There has been previous research done in the field of industrial arts in several states; for example, in the states of Oklahoma, Texas, Kansas, and Tennessee, research has been done by Lemuel W. Apala, R. W. Thornton, Fred J. Hill, James L. Sharpton, R. D. Teague, and W. M. Stover.

Lemuel W. Apala

Lemuel W. Apala, in 1949, conducted his research in the small schools in Oklahoma to ascetain what industrial arts courses were in the curriculum. At that time, Apala found that mechanical arts

drawing courses were offered at only 55 schools out of the 295 schools surveyed; however, he noted that industrial arts had gained a wider acceptance, and a greater number of schools had started such programs. Apala mentioned that the industrial arts teachers had to be very versatile because they were responsible for teaching a variety of classes as well as being effective administrators. He recommended that, in order to effectively teach industrial arts, they should be more specialized rather than undertaking such a variety of responsibilities.[14]

R. W. Thornton

The research done by R. W. Thornton in 1960 focused upon the secondary schools in Texas, and on the factors that affected the efficiency of instructors, curriculum, and the classroom facilities, not specifically on industrial arts drafting. In addition, Thornton's research surveyed the training of instructors, professional as well as academic.[15] He concluded that the industrial arts instructors who participated in the survey were well qualified, academically and profesionally; in addition, they were well informed as to the industrial needs of the nation. Thornton recommended that classrooms be made larger because there was not adequate space available, thus exposing students and instructors to safety hazards. Thornton reported that another problem area was the lack of support by school administrators to accept the importance of industrial arts as a general education elective. Finally, he concluded there was no coordination of the industrial arts program with regard to implementation, curriculum, and basic requirements.[16]

Fred J. Hill

Another survey was done in the state of Kansas on mechanical drawing in 1960. His research focused on what methods were used in teaching mechanical drawing, what the offered subject areas were, what drafting materials were available, the size of the drawing classes, and what improvements, if any, were needed.[17] Hill's survey indicated that although a variety of teaching methods were being used by the industrial arts instructors, all seemed to be accomplishing satisfactory results. Hill reported that, as a result of improved textbooks, industrial arts was becoming more popular; the industrial arts instructors were better informed, they were more able to expand the curriculum and instruct their students more efficiently.

James L. Sharpton

A study was done, in 1967, by James L. Sharpton with regard to the conditions existing at that time and the then current practices in Oklahoma public high school industrial arts programs. Sharpton concentrated on areas which would provide data to detect weaknesses, and identify trends with the intent of evaluating programs, which would allow for possible further improvement in the programs, and guidelines for construction of new programs. Sharpton found that, of the industrial arts teachers surveyed, 47 percent had Master's Degrees and 44 percent had some experience in industry. It was also reported that the facilities were not adequate (25 percent did not have drafting tables), nor were there enough drafting machines (22 percent of those surveyed had only 1 drafting machine).[18]

R. D. Teague

R. D. Teague's survey, in 1949, included all the major equipment involved in the industrial arts programs in Oklahoma public high schools. He analyzed information from 132 usable survey returns concluding that there was not an established concensus as to the purpose of industrial arts programs in Oklahoma; there was no method of record keeping on shop equipment and machines, and most smaller schools only taught woodworking. Teague stated " . . . over half of the course offerings in the schools reached by the survey is some form of woodworking, and that a little over one-fourth of the subjects taught is drafting in some form."[19] Industrial arts, at that time, he concluded, was not a full-fledged education subject in the schools of Oklahoma. He recommended that continuing research be done to bring about more uniform teaching practices and a uniform approach to teaching industrial arts in the schools.

W. M. Stover

Stover's study, done in 1952, was in the Tennessee public high schools. Stover incorporated the same type of instrument as did Teague in order to gather data as to what major equipment was being utilized in the industrial arts programs. His data was from a 67 percent response from the industrial arts teachers in the Tennessee schools.[20]

Stover concluded that industrial arts teachers had too many varied responsibilities as teachers and administrators. There was room for improvement in the areas of shop size and equipment. In addition, there was no comprehensive program for industrial arts teachers; some schools did not have industrial arts programs at all. Stover

recommended that, although the programs in Tennessee are average when compared to the other industrial arts programs in the nation, there should be a comprehensive program implemented on a statewide level with a state supervisor. [21]

Summary

Since the beginning of time, humans have used drawings to communicate. There are many evidences all over the world such as Egyptian hieroglyphics to present day drafting techniques that demonstrate this fact.

With the advancement of societies, individuals undertook the responsibility of initiating trade schools geared to teaching students to become useful at a skill and as integrated members of society. Other individuals designed methods for school shop programs such as William T. Harris, E. E. White, John D. Runkle, and Calvin M. Woodward.

Industrial arts drafting has become an instrumental part of society and technology. Because of the rapid rate that new technology has developed, it has been necessary to do research and evaluate existing programs. It is the only feasible way to provide the best possible training for students who will be utilizing what they have learned in their respective communities.

ENDNOTES

[1]Rex Miller and Lee H. Smalley, Selected Readings for Industrial Arts (Bloomington: McKnight and McKnight Publishing Company, 1963), p. 221.

[2]Melvin L. Barlow, History of Industrial Education in the United States (Peoria: Charles A. Bennett Company, Inc., 1967), p. 494.

[3]Ibid., pp. 25-27.

[4]Ibid., p. 26.

[5]Ibid., p. 27.

[6]Ibid., p. 21.

[7]Ibid.

[8]Ibid., pp. 34-41.

[9]William P. Spence, Drafting Technology and Practice (Peoria: Bennett Publishing Company, 1980), p. 12.

[10]Ibid.

[11]Ibid.

[12]Ibid., pp. 16-17.

[13]Oklahoma State Department of Education, Industrial Arts in Oklahoma (Oklahoma City, 1951), p. 15.

[14]Lemuel W. Apala, "A Study of the Course Offerings in a Small High School in Oklahoma with Special Emphasis on Industrial Arts," (Unpub. Master's Thesis, Oklahoma State University, 1949), p. 52.

[15]R. W. Thornton, "Survey of Industrial Arts in the Secondary Schools of Texas," (Unpub. report, Oklahoma State University, 1960), pp. 46-80.

[16]Ibid., p. 101.

[17]Fred J. Hill, "A Survey of Teaching Mechanical Drawing," (Unpub. report, Oklahoma State University, 1960), pp. 34-45.

[18]James L. Sharpton, "A Survey of Industrial Arts Drafting Programs in Oklahoma Public High Schools During 1966-1967," (Unpub. Master's Thesis, Oklahoma State University, July, 1967), p. 2.

[19]Rufus Donald Teague, "A Study of Major Equipment in High School Shops of Oklahoma in 1949," (Unpub. Master's Thesis, Oklahoma Agricultural and Mechanical College, 1930), p. 7.

[20]Walter M. Stover, "A Survey of the Major Equipment in the Industrial Arts Shops in the Tennessee High Schools in 1952," (Unpub. Master's Thesis, Oklahoma Agricultural and Mechanical College, 1953), p. 2.

[21]Ibid., p. 115.

CHAPTER III

METHODOLOGY

Introduction

In Chapter I, the objective of this study was delineated; i.e., to determine the existing conditions and current practices of industrial arts drafting programs in the public high schools of Oklahoma. Chapter III will present the reader with the design of the research, the procedures for data collection, and the subsequent treatment of the data. In addition, the writer used Sharpton's previous research, "A Survey of Industrial Arts Drafting Programs in Oklahoma Public High Schools During 1966-67",[1] for evaluation and comparison to the present day industrial arts drafting programs in Oklahoma's public high schools (1983-84).

Design

The specific information requirement for this study as determined from the problem was an analysis of the industrial arts drafting programs in the Oklahoma public high schools during the school year 1983-84. The data was obtained by using an oral, telephoned questionnaire, (Appendix B) and the development of the instrument was based on Sharpton's research survey done in 1967 to evaluate and compare the industrial arts drafting programs in Oklahoma's public high schools.[2]

Procedures for Data Collection

Selection of the Subjects

The drafting instructors surveyed were selected from the Oklahoma public high school's annual directory which listed the drafting instructors for the school year 1983-84. There were approximately 400 instructors listed; these were divided into consecutive groups of four with an assigned number. One out of four was chosen with a die cast and the corresponding numbers recorded.[3]

Construction of the Oral Questionnaire

With the objective of identifying the existing conditions of the Oklahoma public high schools' industrial arts programs, the oral questionnaire was telephoned to those selected for the survey. The questions were constructed in a concise manner so as to gather the statistics required for a survey of this nature. The class members of Research Design in Occupational Education were presented with a copy of the questionnaire for discussion and criticism--this also provided a general, but not authoritative means for making revisions based upon input from the test class.

Administration of the Questionnaire

One hundred drafting instructors in the Oklahoma public high schools were telephoned and orally surveyed through the use of the questionnaire. There were financial, geographical, and time constraints concerning the administration of the survey; however, the writer felt he would obtain a better response via the telephone survey.

Instructors that responded to the survey comprised 100 percent.

Validity of the Data

There were several criteria the writer took into consideration with regard to the validity of the data. These were: (1) the validity of the questionnaire technique itself--perhaps it would have been better to use the method of mailing a questionnaire to the selected respondents than to have interviewed them on the telephone; (2) the validity of the specific questionnaire used--perhaps some of the questionnaire did not apply to a particular school where the instructor taught; and, (3) the validity of the responses--perhaps some of those selected for the oral questionnaire had prejudicial attitudes about the use of a telephone survey rather than a mailed questionnaire.

Because of financial, geographical, and time constraints, the oral survey method was used in lieu of a personal survey. Most probably, the personal survey method would have been the optimum approach.

The construction of a usable, oral questionnaire was another factor, because, in obtaining a representative percentage of responses, the questionnaire had to be objective, comprehensive, while on the other hand, not too lengthy, not too difficult, and not too detailed.

Finally, the validity of the respondents was considered. Individuals are diverse; therefore, these differences, when coupled with interpretation and human nature, not to mention other unforeseen factors, were taken upon good faith when the data was received.

Treatment of Data

The data received from the oral, telephoned questionnaire was

tabulated into six major areas: (1) instructor's background; (2) drafting room facilities; (3) methods of presentation; (4) title of drafting courses offered; (5) subjects taught; and (6) size of drafting classes.

The questionnaire responses were listed as to the frequency of occurrence, followed by determining percentages for each response area. Each table listed the pertinent question below it. The results are presented in Chapter IV.

Instructor's Background

The questionnaire contained questions to determine the educational background (B.S. or M.S.), the industrial experience, and experience in drafting of the selected respondents.

Drafting Room Facilities

Adequate facilities are an important facet of the industrial arts program; therefore, the questionnaire asked the respondents about these items: drafting machines, reproduction printer, light table, electric eraser, overhead projector, movie projector and drafting tables.

Methods of Presentation

The oral, telephoned questionnaire was used to obtain data from the respondents about the current methods being used: lecture, demonstration, questioning and discussion, films, transparencies, charts, and models.

Title of Drafting Courses

The oral questionnaire contained a list of drafting courses which the respondents replied to. These were: Drafting I, Drafting II, Architectural, Design, Mechanical Drawing I, Mechanical Drawing II, Mechanical Drawing III, Technical, and Machine.

Subject Area Taught

The survey, via the telephone, was to discover which subject areas were presented on a most frequent basis in the classroom. The subject areas were: Freehand Sketching, Lettering, Geometric Construction, Orthographic Projection, Dimensioning, Auxiliary Views, Sections, Surface Developments, Cams, Gears, Architecture, Map Drafting, Electrical and Electronic, Aerospace, Isometric, Dimetric, Trimetric, Oblique, Perspective, Welding Drawings, Inking, Screws and Bolts, Other Fasteners, Working Drawings, Detail Drawings, Blue Print Reading, Reproduction of Drawings, and Computer Aided Drafting.

Size of Drafting Classes

The questionnaire was also used to determine the size of the drafting classes.

Number of Instructors Per School

The survey of the respondents with the telephoned questionnaire method was used to ascertain the number of instructors per school.

Fee Charge

The questionnaire provided the survey with data from the

respondents as to the fee charge for the classes.

The oral questionnaire was read, via telephone, to the selected respondents, and the results, in tabular form, are in Chapter IV.

ENDNOTES

[1]James LeRoy Sharpton, "A Survey of Industrial Arts Drafting Programs in Oklahoma Public High Schools During 1966-1967," (Unpub. Master's Thesis, Oklahoma State University, July, 1967), p. 6.

[2]Ibid., p. 19.

[3]Ibid., p. 21.

CHAPTER IV

RESULTS

In Chapter I, the objective of this study was presented--to determine the present status of the industrial arts drafting programs in Oklahoma's public high schools. Chapter IV will present the results of the study.

Return Rates

One hundred respondents were selected to be interviewed on the telephone with the use of a questionnaire. The return rate was 100 percent.

Survey Data

The six major areas in which the drafting instructors were asked to respond to were: (1) instructor's background; (2) drafting room facilities; (3) methods of presentation; (4) title of drafting courses offered; (5) subject areas taught; and (6) size of drafting classes. The responses to the oral, telephoned survey are listed as to frequency of occurrence, and each area of response has been calculated in terms of percentages. There are eight tables and each one has the question placed below it for the convenience of the reader.

Instructor's Background

Questions One and Two pertain to the instructor's background and actual industrial experience. Table I shows that all who teach industrial arts drafting in Oklahoma's public high schools have Bachelor's Degrees; in addition, 50 percent have Master's Degrees. Sixty-eight percent of those interviewed in the survey have had industrial experience, although those having actual drafting experience comprise only 8 percent.

TABLE I

INSTRUCTOR'S BACKGROUND

Background	Frequency	Percent of Total Number
Bachelor's Degree	100	100%
Master's Degree	50	50%
Industrial Experience	68	68%
Experience in Drafting	8	8%

Question 1. Degrees Held: B.S. ___ M.S. ___ Other _____

Table II reveals that 33 percent of those surveyed have had 10-19 years of industrial experience, and an additional 30 percent have had industrial experience, but it has been less than 1-4 years altogether.

TABLE II

INDUSTRIAL EXPERIENCE

Years	Frequency	Percent
1-4	30	30%
5-9	4	4%
10-14	23	23%
15-19	10	10%
20-24	1	1%
25-30	0	0

Question 2. Industrial Experience: Yes ___ No ___
If yes, number of years__
What trade? _____

Drafting Room Facilities

When teaching industrial arts drafting, the facilities and equipment are important criteria for incorporating a successful program. The purpose of Question Three was to ascertain the current status of the facilities and equipment. Table III reveals that 92 percent have drafting tables. Taking this into consideration, there are 8 percent who must facilitate their instruction in some other less favorable manner. Thirty-three percent of the schools surveyed had drafting machines and 31 percent had a reproduction printer(s).

TABLE III

DRAFTING ROOM FACILITIES

Facilities	Frequency	Percentage*
Drafting machines	33	33%
Reproduction printer	31	31%
Light table	19	19%
Electric eraser	13	13%
Overhead projector		
1. Permanent	64	64%
2. Part time	27	27%
3. Not available	9	9%
Movie projector	97	97%
Drafting tables	92	92%

Question 3. Drafting room facilities

*Percent of 100 responses.

Methods of Presentation

Question Seven in the survey pertained to determining what practices and methods were utilized by the drafting instructors when teaching the students. Table IV delineates the frequency of the various methods used and, in percentages, a comparison of each is presented relative to the total response. The predominant methods used were those of demonstrations (17.1%), lectures (17.1%), questioning and discussion (17.1%).

Table IV also revealed that 69 percent of the instructors used

transparencies in the classroom, although 64 percent reported having access to overhead projectors.

TABLE IV

METHODS OF PRESENTATION

Methods	Frequency	Of Total Percentage
Lecture	100	17.1%
Demonstration	100	17.1%
Questioning and Discussion	100	17.1%
Films (sound)	63	10.8%
Transparencies	69	11.8%
Charts	77	13.2%
Models	73	13.2%
Totals	582	

Question 7. Methods of presentation

Title of Drafting Courses

Although one would expect courses in drafting titled Drafting I, Drafting II, this is not the case in Oklahoma. Table V (Question Eight) reveals that Drafting I is used as a course title 40.3 percent of the time followed by Drafting II (17.3%), Mechanical Drawing I (15.3%), and Architectural (14.8%). Other beginning courses are occasionally called Design, Technical, Machine and Solar I.

TABLE V

TITLE OF DRAFTING COURSE

Title	Frequency	Percent
Drafting I	79	40.3%
Drafting II	34	17.3%
Architectural	29	14.8%
Design	4	2.0%
Mechanical Drawing I	30	15.3%
Mechanical Drawing II	12	6.1%
Mechanical Drawing III	2	1.0%
Technical	2	1.0%
Machine	3	1.6%
Other		
Solar I	1	.5%

Question 8. Title of drafting courses offered

Subject Areas Taught

The purpose of this section of the questionnaire was to determine which areas in drafting were most frequently taught to the students in the Oklahoma public high school drafting classes (Question Nine). Table VI gives the frequency of response and a percentage of the total areas taught. There were eight subject areas that received the highest percentage. These were: (1) lettering (5.3%), (2) dimensioning (5.3%), (3) orthographic projection (5.2%), working drawings

(3.0%), (5) isometric projection (5.3%), (6) sections (5.0%), (7) auxiliary views (5.0%), and geometric construction (5.2%). In addition, it was revealed that computer aided drafting, with 0.1%, was the area taught by the instructors the least. Computer aided drafting is a relatively new area which requires a computer system; at this time, however, the majority of the public high schools in the state of Oklahoma do not have this equipment.

Size of Drafting Classes

Table VII (Question Five) reveals that 20 percent of the drafting classes have 14-15 students, while 12 percent of the drafting classes have 10-11 students, and 10 percent have 8-9 students.

Number of Instructors Per School

Table VIII (Question Four) reveals that 89 percent of the public high schools in the State of Oklahoma have 1 drafting instructor per school. The remaining 11 percent have more than 1 drafting instructor per school. The majority of the schools that have more than 1 drafting instructor are those that are in the metropolitan areas and have a larger school population.

Fee Charge

After obtaining data from the 100 selected respondents as to whether or not there was a fee charge for the industrial arts classes, it was revealed that there was no charge. All 100 respondents indicated in the survey that it was school policy not to charge the students fees for the classes.

TABLE VI

SUBJECT AREAS TAUGHT

Subject Area	Frequency	Percent
Freehand sketching	83	4.5%
Lettering	98	5.3%
Geometric construction	90	5.2%
Orthographic projection	96	5.2%
Dimensioning	97	5.3%
Auxiliary views	91	5.0%
Sections	91	5.0%
Surface developments	68	3.7%
Cams	51	2.8%
Gears	55	2.3%
Arhictecture	86	4.7%
Map drafting	31	1.7%
Electrical and electronic	32	1.7%
Aerospace	10	0.5%
Isometric	97	5.3%
Dimetric	41	2.2%
Trimetric	35	2.0%
Oblique	83	4.5%
Perspective	83	4.5%
Welding drawings	34	1.8%
Inking	59	3.2%
Screws and bolts	76	4.1%
Other fasteners	53	2.9%
Working drawings	91	5.0%
Detail drawings	87	4.7%
Blue print reading	70	3.9%
Reproduction of drawings	47	2.5%
Computer-aided drafting	3	0.1%
Total	1838	

Question 9. Subject areas taught in drafting

TABLE VII

SIZE OF INDUSTRIAL ARTS DRAFTING CLASSES

Average Number of Pupils Per Class	Frequency	Percentage
1-3	5	5.0%
4-5	5	5.0%
6-7	4	4.0%
8-9	10	10.0%
10-11	12	12.0%
12-13	7	7.0%
14-15	20	20.0%
16-17	8	8.0%
18-19	7	7.0%
20-21	8	8.0%
22-23	3	3.0%
24-25	9	9.0%
26-27	1	1.0%
28-29	1	1.0%
30-31	3	3.0%
Total	100	100.00%

Question 5. Size of Industrial Arts Drafting Classes

TABLE VIII

NUMBER OF INSTRUCTORS PER SCHOOL TEACHING INDUSTRIAL ARTS DRAFTING IN OKLAHOMA PUBLIC HIGH SCHOOLS

Instructor Per School	Frequency	Percentage
1	89	89%
2	8	8%
3	2	2%
4	0	0%
5	1	1%

Question 4. Number of industrial arts drafting instructors in your school

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to ascertain the present conditions and practices among the industrial arts drafting instructors in the Oklahoma public high schools during the school year 1983-1984. To obtain the necessary data, 100 out of 400 respondents were selected from the Oklahoma public high school's annual directory for the school year 1983-1984 and a questionnaire was administered to the respondents by way of an oral, telephoned presentation. Each section of the questionnaire was then divided and translated so as to facilitate the answers to the major objectives as listed in Chapter I: (1) what is the educational background of the industrial arts drafting instructor; (2) what industrial experience does the instructor have; (3) what is being taught; (4) what classroom facilities are available; (5) what methods of presentation are being used; and (6) what is the average size of the industrial arts drafting class.

There were 100 instructors that were selected as potential respondents to the oral questionnaire, and the return rate was 100 percent.

The objective of this study was to determine the present status of the industrial arts drafting programs in the Oklahoma public high schools. By administering the oral questionnaire to the respondents,

it was possible to determine the educational background of the instructor, what industrial experience, if any, the drafting instructor had, what classroom facilities were available to the drafting instructor, what methods of presentation were being used, and finally, what the average size of the drafting class(es) was.

Conclusions

From the resulting data, it was possible to compare and evaluate the existing industrial arts programs in the Oklahoma public high schools. After having tabulated and analyzed the information gathered from the participants in the survey, there are some observations that can be articulated as follows:

(1) at the present time, there is no developed, systematic methodology in practice with regard to the industrial arts drafting programs in the public high schools in the state of Oklahoma;

(2) some schools are more advanced and others are indeed lacking in certain areas, especially with respect to facilities and equipment;

(3) drafting instructors are well informed about the needs of industry and society;

(4) there is a shortage of female industrial arts drafting instructors;

(5) drafting instructors are still being asked to perform non-teaching duties such as driver's education and coaching in addition to their normal classroom responsibilities;

(6) there is a bridge that needs to be gapped between some industrial arts drafting instructors and the computer age;

(7) students need better drafting instruction earlier in their

academic career; and,

(8) there is no standard of discipline taught in the educational environment.

Recommendations

The following is a list of recommendations that the writer has compiled based upon the study:

(1) the programs in industrial arts must be given the opportunity to have access to necessary funding for equipment and subsequent maintenance and repair; in addition, when equipment needs to be replaced, it should be done;

(2) school administrators should give their full support to the industrial arts programs so they can be elevated to an equal status with that of other necessary curricula such as Mathematics and English;

(3) there should be a more comprehensive program for the purpose of facilitating better drafting instruction;

(4) there should be seminars and/or workshops conducted for those who are in the industrial arts drafting profession with the purpose of formulating a comprehensive curriculum for the students and providing a list of necessary equipment; in addition, these seminars and/or workshops could provide information as to the management aspects of equipment, maintenance and facilities;

(5) there should be more recruitment of female students for the industrial arts programs; and,

(6) because technology has brought about the computer age and will undoubtedly bring about other modern tools which can facilitate better education, there should be a concerted effort to introduce

these new tools of education and industry to industrial arts drafting instructors so they can become comfortable and knowledgeable about their advantages and use them in the classroom.

These recommendations would bring about an improvement in the drafting programs, happier instructors, and better students.

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APPENDIXES

APPENDIX A

ORAL PHONED INTRODUCTION

A STUDY OF INDUSTRIAL ARTS DRAFTING PROGRAMS IN OKLAHOMA PUBLIC HIGH SCHOOLS DURING 1983-1984

ORAL, PHONED INTRODUCTION

Hi, I'm Lowell Garrett.

As a graduate research student in the Department of Industrial Arts Education at Oklahoma State University, I am currently making a study of the various curriculum offerings in industrial arts drafting programs in Oklahoma public secondary schools. The purpose of this study is to improve instruction in the various areas. It is desirable to know the present status of the industrial arts drafting program in the secondary schools of Oklahoma so that existing conditions and practices can be made available.

I am making a telephone survey to collect the necessary information for the purpose of writing a Master's Degree thesis entitled, "A Survey of Industrial Arts Drafting Programs in Oklahoma Public High Schools During 1983-84." I am attempting to contact a random sampling of industrial arts drafting instructors in the Oklahoma public secondary schools so that a detailed description can be made.

The following questions are designed to secure this information in the most direct manner possible. I have attempted to keep the questions brief and objective to conserve your time when answering them.

Your cooperation will be greatly appreciated.

Thankyou.

APPENDIX B

A STUDY OF INDUSTRIAL ARTS DRAFTING PROGRAMS IN OKLAHOMA PUBLIC HIGH SCHOOLS DURING 1983-1984

A STUDY OF INDUSTRIAL ARTS DRAFTING PROGRAMS IN OKLAHOMA PUBLIC HIGH SCHOOLS DURING 1983-1984

Lowell D. Garrett, Jr., Graduate Student
Department of Industrial Arts Education
Oklahoma State University
Fall 1983

Directions: Please respond with your answer to each of the following questions.

Name_____

School_____City_____

1. Degrees held: B.S._____M.S._____Other_____

2. Industrial experience:

   Yes_____No_____If yes, number of years_____What trade?_____

   _____

3. Drafting room facilities in your school

   a. Drafting machine. . . . . Yes_____No_____Number_____

   b. Reproduction printer(s) . . . . . Yes_____No_____Number_____

   c. Light table . . . . . Yes_____No_____Number_____

   d. Electric erasers . . . . . Yes_____No_____Number_____

   e. Overhead projector . . . . . .

      Permanent _____
      Part time _____
      Not available _____

   f. Movie projector . . . . . Yes_____No_____Number_____

   g. Drafting tables . . . . . Yes_____No_____Number_____

b. Other_____

_____

4. Number of industrial arts drafting instructors in your school_____

5. Average number of drafting students in your classes_____

6. Is there a fee charge for the course? Yes_____No_____How Much?

_____

7. Methods of presentation in your school

		Percentage of Time
a. Lecture.	Yes_____No_____	_____
b. Demonstration.	Yes_____No_____	_____
c. Questioning and discussion . . .	Yes_____No_____	_____
d. Films (sound)	Yes_____No_____	_____
e. Transparencies	Yes_____No_____	_____
f. Charts	Yes_____No_____	_____
g. Models	Yes_____No_____	_____
h. Other.	Yes_____No_____	_____

_____

8. Title of drafting courses offered in your school

	Grade Level	Plates Required
a. Drafting I	_____	_____
b. Drafting II	_____	_____
c. Architectural	_____	_____
d. Design	_____	_____
e. Mechanical Drawing I	_____	_____
f. Mechanical Drawing II	_____	_____

g. Other_____

_____

9. Subject areas taught in drafting in your school

a. Freehand sketching. . . . . Yes_____ No_____

b. Lettering . . . . . Yes_____ No_____

c. Geometric construction . . . . . Yes_____ No_____

d. Orthographic projection . . . . . Yes_____ No_____

e. Dimensioning. . . . . Yes_____ No_____

f. Auxiliary views . . . . . Yes_____ No_____

g. Sections. . . . . Yes_____ No_____

h. Surface developments. . . . . Yes_____ No_____

i. Cams. . . . . Yes_____ No_____

j. Gears . . . . . Yes_____ No_____

k. Architecture. . . . . Yes_____ No_____

l. Map drafting. . . . . Yes_____ No_____

m. Electrical and electronic . . . . . Yes_____ No_____

n. Aerospace . . . . . Yes_____ No_____

o. Isometric . . . . . Yes_____ No_____

p. Dimetric. . . . . Yes_____ No_____

q. Trimetric . . . . . Yes_____ No_____

r. Oblique . . . . . Yes_____ No_____

s. Perspective . . . . . Yes _____ No_____

1. One-point . . . . . Yes_____No_____
2. Two-point . . . . . Yes_____No_____
3. Three-point . . . . . Yes_____No_____

t. Welding drawings . . . . . Yes_____ No_____

u. Inking. . . . . Yes_____ No_____

v. Screws and bolts. . . . . Yes_____ No_____

w. Other fasteners . . . . . Yes_____ No_____

x. Working drawings. . . . . Yes_____ No_____

y. Detail drawings . . . . . Yes_____ No_____

z. Blue print reading . . . . . Yes_____ No_____

aa. Reproduction of drawings . . . . . Yes_____ No_____

bb. Computer-aided drafting . . . . . Yes_____ No_____

APPENDIX C

INDUSTRIAL ARTS DRAFTING INSTRUCTORS

SURVEYED ON THE TELEPHONE

INDUSTRIAL EDUCATION INSTRUCTORS SURVEYED ON THE TELEPHONE

INSTRUCTOR	CITY
Mr. Fred C. Aaron	Midwest City
Mr. Ronald Adams	Wilburton
Mr. Ed Adams	Shawnee
Mr. Charles Addington	Afton
Mr. Gary Aldridge	Cushing
Mr. Ronnie Avant	Arapaho
Mr. Doug Bails	Sayre
Mr. Monty Beaty	Cashion
Mr. Calvin Bell	Inola
Mr. Gary Bell	Hobart
Mr. Marvin Best	Oklahoma City, Capitol Hill
Mr. Donovan Bowers	Fairview
Mr. James Broughton	Tulsa, Webster
Ms. Cindy Buckner	Edmond
Mr. Arlin Chauvin	Edmond
Mr. Mike Cline	Tyrone
Mr. Dwight A. Cope	Comanche
Mr. Floyd J. Cox	Stilwell
Mr. Tim Crissup	Waynoka
Mr. Gerald Cross	Fletcher
Mr. Ted Cummings	Kellyville
Mr. David Day	Norman
Mr. Earl Deter	Guthrie
Mr. Doyle Dobbins	Ketchum
Mr. Johnny E. Dudek	Oklahoma City, Star Spencer
Mr. Ronnie Duncan	LaVerne
Mr. Johnny Duncan	Okmulgee
Mr. Brent Earp	Luther
Mr. Harold Fallis	Midwest City
Mr. James Fanning	Cherokee
Mr. Burton Ferrell	Bethany
Mr. Charles Fesmire	Helena
Mr. Bryan Flaming	Weatherford
Mr. Bobby Ford	Broken Arrow
Mr. Jerry Frazier	Oklahoma City, John Marshall
Mr. Joe Fulbright	Dale
Mr. Keith Gan	Tulsa, Hale
Mr. Charles Gillham	Prague
Mr. Hugh C. Gouldy	Moore
Mr. Richard Griesel	Pawnee
Mr. Donald Gunter	Burns Flat
Mr. Morris Hale	Ada
Mr. John D. Hanks	Ponca City
Mr. Clyde Hanlin	Tulsa, Union
Mr. Jackie Harmon	Snyder
Mr. Reese Harmon, Jr.	Oklahoma City, Douglass
Mr. Toby Hawkins	Mountain View
Mr. Robert Horn	Carnegie

INSTRUCTOR	CITY
Mr. Barford E. Huff	Oklahoma City, Putnam City West
Mr. Clyde Jackson	Buffalo
Mr. Dwayne Janzen	Kremlin
Mr. Roy A. Jennings	Rush Springs
Mr. Earl E. Jetton	Pawhuska
Mr. Noble Jobe, Jr.	Choctaw
Mr. Kevin L. Johnston	Jenks
Mr. Mike Lawson	Durant
Mr. Charles Lee	Shidler
Mr. Jerry L. Logan	Oklahoma City, Millwood
Mr. Orville Long	Cordell
Mr. Dennis Maimbourg	Broken Arrow
Mr. George McCreary	Vinita
Mr. Jerald D. McDonald	Davis
Mr. Tom McEndarfer	Tulsa, Nimitz
Mr. Dewey Metheny	Oklahoma City, U. S. Grant
Mr. Lester Milford	Duncan
Mr. Bill Miller	Crescent
Mr. Henry Moyer	Chelsea
Mr. Johnny Nichols	Pryor
Mr. Ray Nikkles	Midwest City, Carl Albert
Mr. Bob Niles	Enid
Mr. Kelly Nordquist	Canton
Mr. Bob Patterson	Marlow
Mr. Lloyd Peck	Kingfisher
Mr. Willard N. Perry	Muskogee
Mr. Glen L. Phillips	Guymon
Mr. David W. Pounds	Okarche
Mr. Joe Pryor	Ada
Mr. Billy J. Reese	Bokoshe
Mr. Alvis Richey	Cache
Mr. David Rickner	Bixby
Mr. Joseph E. Ritchey	Lindsay
Mr. David L. Rowland	McAlester
Mr. Duane Selvey	Tulsa, Will Rogers
Mr. Jack D. Shafer	Keyes
Mr. Brooks T. Shaw	McCurtain
Mr. Dale R. Simpson	Tonkawa
Mr. Winston Smith	Stillwater
Mr. Greg P. Smith	Bartlesville
Mr. James Stewart	Tuttle
Mr. Jeff D. Swindell, Jr.	Lawton
Mr. Shelly Turpin	Calvin
Mr. Norman Vetter	Claremore
Mr. Terry Vowell	Thomas
Mr. Herschel B. Watson	Erick
Mr. Bobby Welch	Olustee
Mr. Clifford Westcott	Canute
Mr. Alfred Wheeler	Durant
Mr. Oren Zehner	Owasso
Mr. Earl E. Zerby	Yukon

VITA 2

Lowell Devernise Garrett, Junior

Candidate for the Degree of

Master of Science

Thesis: A STUDY OF INDUSTRIAL ARTS DRAFTING PROGRAMS IN OKLAHOMA PUBLIC HIGH SCHOOLS DURING 1983-1984

Major Field: Industrial Arts Education

Biographical:

Personal Data: Born in Dallas, Texas, January 31, 1950, the son of Lowell D. and Mary E. Garrett.

Education: Graduated from North Dallas High School, Dallas, Texas, in May, 1968; received Bachelor of Science degree in Industrial Arts Education from Oklahoma State University in December, 1982; completed requirements for the Master of Science degree in May, 1984.

Professional Experience: Student teacher, Stillwater High School, Spring, 1982; graduate teaching assistant, Oklahoma State University, 1983-1984.